

Name: _____

Date: _____

A2 CC Q3QT Review

THIS REVIEW IS NOT COMPREHENSIVE. BE SURE TO STUDY YOUR NOTES, HOMEWORK ASSIGNMENTS, AND OLD TESTS AS WELL.

1. If $f^{-1}(x) = \frac{1}{3}x + 7$ then which of the following is the correct formula for $f(x)$?

(1) $f(x) = -\frac{1}{3}x - 7$ (3) $f(x) = 3x - 7$

(2) $f(x) = 3x - 21$ (4) $f(x) = -3x + 21$

2. If the linear function $y = -2x + 10$ has a domain given by $[-1, 4]$ then which of the following is its range? _____

(1) $[2, 12]$ (3) $[-5, 7]$

(2) $[0, 16]$ (4) $[-2, 10]$

3. If the expression $\frac{1}{\sqrt{x}}$ was written as x^n then which of the following would be the value of n ? _____

(1) $\frac{1}{2}$ (3) $-\frac{1}{2}$

(2) 2 (4) -2

4. Which of the following is *not* a factor of $3x^3 + 2x^2 - 12x - 8$? _____

(1) $x - 2$ (3) $x + 2$

(2) $x - 4$ (4) $3x + 2$

5. The quadratic function $f(x)$ has a turning point at $(-3, 8)$. If the function g is defined by $g(x) = -f(x+5)$ for all values of x then at which of the following points will $g(x)$ have a turning point?

(1) $(-8, -8)$ (3) $(8, -8)$

(2) $(5, -3)$ (4) $(-2, 8)$

6. The function $f(x)$ is an odd function with $f(3) = 7$ and $f(9) = 11$. What is the average rate of change of $f(x)$ over the interval $-3 \leq x \leq 9$?

(1) $\frac{1}{3}$ (3) 3

(2) $\frac{3}{4}$ (4) $\frac{3}{2}$

7. The expression $\frac{\sqrt{x}}{\sqrt[6]{x}}$, for $x > 0$, is equivalent to which of the following?

(1) $\sqrt[5]{x}$ (3) $\sqrt[6]{x^4}$

(2) $\sqrt[3]{x}$ (4) $\sqrt[3]{x^2}$

8. If $ab^{\frac{x}{c}} = d$, where a, b, c , and d are all positive constants, then which of the following is the solution for x in terms of a, b, c , and d ?

(1) $x = \frac{(ad)^b}{c}$ (3) $x = c \log_b(ad)$

(2) $x = \frac{\left(\frac{d}{a}\right)^c}{b}$ (4) $x = c \log_b\left(\frac{d}{a}\right)$

9. If a parabola has a focus of $(3, 5)$ and a turning point of $(3, 2)$ then which of the following represents the equation of its directrix?

(1) $x = 3$ (3) $x = 5$

(2) $y = -1$ (4) $y = 8$

10. For the exponential function $f(x) = a(b)^x$ we know that $f(3) = 17$ and $f(7) = 3156$. Which of the following is closest to the value of b ?

(1) 1.87 (3) 3.69

(2) 2.91 (4) 4.35

11. A line is drawn from the vertex of the parabola $y = (x + 5)^2 + 9$ to the center of the circle whose equation is $(x - 4)^2 + (y - 6)^2 = 100$. Which of the following is the slope of the line?

(1) $\frac{5}{2}$ (3) 3

(2) $-\frac{1}{3}$ (4) $-\frac{5}{3}$

12. If $g(x) = 2x - 1$ and $f(x) = x^2 + 2x$ then $f(g(x)) =$

(1) $x^2 + 4x + 1$ (3) $2x^3 + 3x^2 - 2x$

(2) $2x^2 + 6x + 3$ (4) $4x^2 - 1$

13. If the function $f(x)$ has zeroes at -4 and 10 , then which of the following would have zeroes at -2 and 5 ?

(1) $f(x + 2)$ (3) $\frac{1}{2}f(x)$

(2) $f(2x)$ (4) $f\left(\frac{1}{2}x\right)$

FREE RESPONSE QUESTIONS: Clearly indicate the necessary steps and explain your reasoning for each of the following problems.

14. Solve the following equation algebraically.

$$3^{x^2} = \left(\frac{1}{9}\right)^{x-4}$$

15. Solve the following system of equations algebraically.

$$\begin{aligned}2x + y - z &= 19 \\ -3x + 2y + 4z &= -9 \\ 5x - 2y + 2z &= 7\end{aligned}$$

16. Consider the function $f(x) = \log_2(x-4)$.

(a) Explain why $x=0$ is *not* part of the domain of $f(x)$.

(b) Max proposed the function $g(x) = 2^x + 4$ as the inverse of $f(x)$. Supply numerical evidence that either supports or disproves Max's claim.

17. Solve the following equation algebraically.

$$(2x+1)^2 - 3(2x+1) - 10 = 0$$

18. The population of bacteria in an experiment can be modeled by $p(d) = 400(1.56)^d$, where d is the number of days the population has been growing.

(a) Find the average rate the population has been growing over the interval $0 \leq d \leq 7$. Round to the nearest integer and include appropriate units.

(b) If the population of bacteria was modeled as a function of the number of hours, h , such that $p(h) = 400b^h$, then what would be the value of b to the nearest thousandth? Show or explain how you found your answer.

19. Given the function $f(x)$ shown graphed and $g(x) = -f(2x)$ answer the following questions.

(a) Evaluate $g(4)$. Show how you arrived at your answer.

(b) Produce a graph of $g(x)$ on the same grid as $f(x)$.

(c) State the domain and range of $g(x)$.

